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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/672,078

09/29/2003

Ehud Langberg

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11/15/2006

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EXAMINER

ODOM, CURTIS B

ART UNIT

PAPER NUMBER

2611

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/672,078	<b>Applicant(s)</b> LANGBERG ET AL.	
	<b>Examiner</b> Curtis B. Odom	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

1. The abstract of the disclosure is objected to because of the following:
  - a. In line 1, "NEXT and FEXT" is suggested to be changed to "Near-End Crosstalk (NEXT) and Far-End Crosstalk (FEXT)".
  - b. In claim 5, "CPE and at the CO" is suggested to be changed to "Customer Premises Equipment (CPE)" and at the Central Office (CO)".Correction is required. See MPEP § 608.01(b).

### *Claim Objections*

2. Claims 4-8 and 17-21 are objected to because of the following informalities:
  - a. In claims 4 and 17 "ADSL" is suggested to be changed to "Asymmetric Digital Subscriber Line (ADSL)".
  - b. In claims 5 and 18, "NEXT" is suggested to be changed to "Near-End Crosstalk (NEXT)".
  - c. In claims 6 and 19, "FEXT" is suggested to be changed to "Far-End Crosstalk (FEXT)".
  - d. In claims 7 and 20, "CPE" is suggested to be changed to "Customer Premises Equipment (CPE)".

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- e. In claims 8 and 21, "CO" is suggested to be changed to "Central Office".

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the limitation "A method for reducing interference due to handshake tones in the time domain". Claim 14 recites the limitation "A system for reducing interference due to handshake tones in the time domain". However, claim 1 and 14 do not define or recite how or when the interference is reduced in the method/system. Thus, without this definition/recitation, one of ordinary skill in the art would not be enabled to make/use the invention.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-8, 12-21, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (U. S. Patent No. 6, 934, 345) in view of Ross et al. (U. S. Patent No. 5, 652, 799).

Regarding claim 1, Chu et al. discloses a method for reducing correlated noise (see column 4, lines 8-13) due to crosstalk (see column 15, lines 31-37), in an ADSL environment (see column 17, lines 30-44) in the time domain, wherein it is the understanding of the examiner crosstalk is due to handshake tones in ADSL (see instant specification page 4, lines 3-7) the method comprising the steps of:

receiving (Fig. 7) an input signal in the time domain having a correlated noise time component (see column 15, lines 31-38);

generating a delayed signal (see Fig. 7, block 175) by delaying the input signal by a symbol period (see column 11, lines 53-57);

generating a prediction signal using a noise predictor (Fig. 7, block 160) based at least in part on an error signal (Fig. 7, 216) which is based on the delayed signal (see column 13, lines 38-41);

comparing the input signal and the prediction signal at Fig. 7, element 135; and

minimizing an error representing a variance between the input signal (received data signal) and the prediction signal (equalized symbol decision) by updating the noise coefficients of the noise predictor (see column 16, lines 30-43, see also column 10, lines 39-49).

Chu et al. does not specifically disclose the input signal has a short correlation time component and a long correlation time component.

However, Ross et al. discloses broadband signals (such as ADSL signals) have short cross-correlation times (see column 3, lines 7-9) and narrowband noises combined with the broadband signals have long correlation times (see Fig. 5B, column 5, lines 11-24). Ross et al. further discloses a delay can be introduced which is greater than the short correlation time of the broadband signals but shorter than the long correlation time of the narrowband noise so that the long correlation noise component can be attenuated (see column 2, lines 36-48, see also column 4, lines 6-11). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the delay of Chu et al. with the delay of Ross et al. in order to attenuate noises with long-correlation times (see Ross et al., column 5, lines 11-15).

Regarding claim 2, Ross et al. further discloses the delay value is greater than the short correlation time component (see column 2, lines 36-48). Therefore, it would have been obvious to include a delay at an upper bound of the short correlation time component in order to attenuate noises with long-correlation times (see Ross et al., column 5, lines 11-15).

Regarding claim 3, Ross et al. further discloses the long noise correlation time component exhibits a high correlation values (see Fig. 5b, column 5, lines 19-27) beyond an upper bound (to the right of D) of the short correlation component shown in Fig. 5a. Therefore, it would have been obvious to include a delay at an upper bound of the short correlation time component in order to attenuate noises with long-correlation times (see Ross et al., column 5, lines 11-15).

Regarding claim 4, Chu et al. further discloses the input signal is a time domain ADSL crosstalk corrupted signal (see column 17, lines 30-44).

Regarding claims 5 and 6, Chu et al. further discloses the correlated noise (see column 4, lines 8-13) due to crosstalk (FEXT and NEXT), see column 15, lines 31-37, in ADSL (see column 17, lines 30-44) is reduced (wherein ADSL includes handshake tones, see instant specification, page 4, lines 3-7).

Regarding claims 7 and 8, Chu et al. and Ross et al. do not specifically disclose the steps of claim 1 are performed at the CPE or CO. However, the instant specification discloses as prior art that ADSL standards include both CO and CPE apparatuses for initialization (see instant specification, page 2, lines 18-27). Therefore, since Chu et al. discloses performing the steps of claim 1 for an ADSL system (see column 17, lines 30-44), it would have been obvious to perform the steps for both the CO and CPE to reduce correlated noise in data transmission and reception between the CO and CPE (see Chu et al., column 4, lines 8-12).

Regarding claim 12, Chu et al. further discloses minimizing an error representing a variance between the input signal (received data signal) and the prediction signal (equalized symbol decision) by updating the noise coefficients using a least mean square error (see column 10, lines 41-49).

Regarding claim 13, Chu et al. discloses the input signal contains correlated noise (see column 15, lines 31-38).

Regarding claim 14, Chu et al. discloses a system (see Fig.7) for reducing correlated noise (see column 4, lines 8-13) due to crosstalk (see column 15, lines 31-37), in an ADSL environment (see column 17, lines 30-44) in the time domain, wherein it is the understanding of the examiner crosstalk is due to handshake tones in ADSL (see instant specification page 4, lines 3-7) the system comprising:

an input for receiving (input to Fig. 7) an input signal in the time domain having a correlated noise time component (see column 15, lines 31-38);

a delay module for generating a delayed signal (see Fig. 7, block 175) by delaying the input signal by a symbol period (see column 11, lines 53-57);

a noise predictor (Fig. 7, block 160) for generating a prediction signal based at least in part on an error signal (Fig. 7, 216) which is based on the delayed signal (see column 13, lines 38-41), wherein the input signal and the prediction signal are compared at Fig. 7, element 135; and an error representing a variance between the input signal (received data signal) and the prediction signal (equalized symbol decision) is minimized by updating the noise coefficients of the noise predictor (see column 16, lines 30-43, see also column 10, lines 39-49).

Chu et al. does not specifically disclose the input signal has a short correlation time component and a long correlation time component.

However, Ross et al. discloses broadband signals (such as ADSL signals) have short cross-correlation times (see column 3, lines 7-9) and narrowband noises combined with the broadband signals have long correlation times (see Fig. 5B, column 5, lines 11-24). Ross et al. further discloses a delay can be introduced which is greater than the short correlation time of the broadband signals but shorter than the long correlation time of the narrowband noise so that the long correlation noise component can be attenuated (see column 2, lines 36-48, see also column 4, lines 6-11). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the delay of Chu et al. with the delay of Ross et al. in order to attenuate noises with long-correlation times (see Ross et al., column 5, lines 11-15).



Regarding claim 15, Ross et al. further discloses the delay value is greater than the short correlation time component (see column 2, lines 36-48). Therefore, it would have been obvious to include a delay at an upper bound of the short correlation time component in order to attenuate noises with long-correlation times (see Ross et al., column 5, lines 11-15).

Regarding claim 16, Ross et al. further discloses the long noise correlation time component exhibits a high correlation values (see Fig. 5b, column 5, lines 19-27) beyond an upper bound (to the right of D) of the short correlation component shown in Fig. 5a. Therefore, it would have been obvious to include a delay at an upper bound of the short correlation time component in order to attenuate noises with long-correlation times (see Ross et al., column 5, lines 11-15).

Regarding claim 17, Chu et al. further discloses the input signal is a time domain ADSL crosstalk corrupted signal (see column 17, lines 30-44).

Regarding claims 18 and 19, Chu et al. further discloses the correlated noise (see column 4, lines 8-13) due to crosstalk (FEXT and NEXT), see column 15, lines 31-37, in ADSL (see column 17, lines 30-44) is reduced (wherein ADSL includes handshake tones, see instant specification, page 4, lines 3-7).

Regarding claims 20 and 21, Chu et al. and Ross et al. do not specifically disclose the system of claim 1 resides at the CPE or CO. However, the instant specification discloses as prior art that ADSL standards include both CO and CPE apparatuses for initialization (see instant specification, page 2, lines 18-27). Therefore, since Chu et al. discloses the system of claim 1 in an ADSL system (see column 17, lines 30-44), it would have been obvious to include the system

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in both the CO and CPE to reduce correlated noise in data transmission and reception between the CO and CPE (see Chu et al., column 4, lines 8-12).

Regarding claim 25, Chu et al. further discloses minimizing an error representing a variance between the input signal (received data signal) and the prediction signal (equalized symbol decision) by updating the noise coefficients using a least mean square error (see column 10, lines 41-49).

Regarding claim 26, Chu et al. discloses the input signal contains correlated noise (see column 15, lines 31-38).

7. Claims 9-11 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (U. S. Patent No. 6, 934, 345) in view of Ross et al. (U. S. Patent No. 5, 652, 799) as applied to claims 1 and 14, and in further view of Bergmans (U. S. Patent No. 4, 905, 254)

Regarding claims 9-11 and 22-24, Chu et al. and Ross et al. do not disclose the noise predictor is a causal filter which uses historical data or one past disturbance to generate the prediction signal.

However, Bergmans discloses a causal filter (see Fig. 2B, feedback (FB) filter) which provides a signal (prediction) used to cancel interference in an input signal (see column 5, lines 4-20), wherein the signal output from the filter is determined by past symbol decisions (see column 5, lines 12-20). Bergmans further discloses the filter has a causal impulse response which includes prior (history) knowledge of the transfer characteristic (noise) of the transmission channel (see column 9, lines 35-47). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the noise predictor of Chu et al. and Ross et al.

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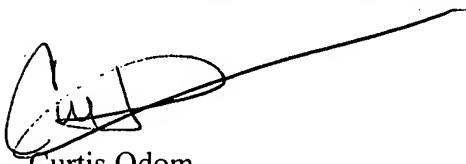
with the causal filter of Bergmans to cancel inter-symbol interference using the past signal data (see column 4, lines 44-53).

### *Conclusion*

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Curtis Odom  
November 13, 2006

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